

Ch 6 (Extra)
Sum and Product of Roots;
Writing Equations when given
the roots

Given the solution set, write the equation.

ex 1:

$\{-5, 3\}$

$$x^2 + 2x - 15 = 0$$

$$(x+5)(x-3) = 0$$

$$\text{sum} = -2$$

$$\text{product} = -15$$

ex 2:

$\{4, 6\}$

$$(x-4)(x-6) = 0$$

$$\text{sum} = 10$$

$$\text{product} = 24$$

$$x^2 - 10x + 24 = 0$$

$$x^2 - (\text{sum})x + \text{product} = 0$$

Given the solution set, write the equation.

ex 3:

$\{-\frac{1}{2}, 4\}$

$$\text{sum} = 3\frac{1}{2}$$

$$\text{product} = -2$$

$$x^2 - 3\frac{1}{2}x - 2 = 0$$

$\times 2$ to remove fractions

$$2x^2 - 7x - 4 = 0$$

Create a common denominator or:

$$ax^2 + bx + c = 0 \quad (\text{Factor out } a)$$

$$a\left(x^2 + \frac{b}{a}x + \frac{c}{a}\right) = 0$$

$$x^2 - (\text{sum})x + \text{product} = 0$$

$$\text{sum} = -\frac{b}{a} \quad \text{product} = \frac{c}{a}$$

$$ax^2 + bx + c = 0$$

$$\text{sum} = \frac{-b}{a}$$

$$\text{product} = \frac{c}{a}$$

Write the equation given the roots:

ex 4:

$$\left\{-\frac{1}{2}, \frac{3}{4}\right\}$$

Write the equation given the roots:

ex 5:

$$\left\{\frac{2-i}{3}, \frac{2+i}{3}\right\}$$

$$x^2 - \text{sum}x + \text{product} = 0$$

$$\frac{2-i}{3} \quad \frac{2+i}{3}$$

$$\text{sum} = \frac{2-i}{3} + \frac{2+i}{3} = \frac{4}{3}$$

$$\text{product} = \left(\frac{2-i}{3}\right)\left(\frac{2+i}{3}\right) = \frac{4-i^2}{9} = \frac{5}{9}$$

$$9\left[x^2 - \frac{4}{3}x + \frac{5}{9} = 0\right]$$

$$9x^2 - 12x + 5 = 0$$

Find k such that
 $4x^2 + kx - 15 = 0$
 has a root of $\frac{3}{4}$, r

$$\text{Sum} = \frac{-b}{a}$$

$$\text{product} = \frac{c}{a}$$

$$\frac{3}{4} + r = \frac{-k}{4}$$

$$\frac{3}{4} \cdot r = \frac{-15}{4}$$

$$r = -5$$

$$\frac{3}{4} + -5 = \frac{-k}{4}$$

$$\frac{3}{4} - \frac{20}{4} = \frac{-k}{4}$$

$$-17 = -k$$

$$17 = k$$

Find k such that
 $x^2 - 2x + k = 0$ has
 a root of $1 - \sqrt{7}$, r

$$\text{sum} = \frac{-b}{a}$$

$$\text{prod} = \frac{c}{a}$$

$$1 - \sqrt{7} + r = 2$$

$$r = 1 + \sqrt{7}$$

$$(1 - \sqrt{7})r = k$$

$$(1 - \sqrt{7})(1 + \sqrt{7}) = k$$

$$-6 = k$$

Also a good check.

Solve.

$$x^2 + 5x - 24 = 0$$

HW

worksheet #s 9-19odd, 16, 20